Diagonal Transmission of Alternating Current Through 2D Conductive Material Sheets Connected at Corners for Hall Effect Mitigation in Nascent Stages for Efficient Electrical Transmission

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Introduction

While there are many promising potential avenues for room-temperature superconduction, practical approaches to high-efficiency non-superconductive electrical transmission that fall short of true superconduction also represent an area with a great deal of potential reward. While few applications require absolute superconduction, there are many applications that would benefit from quasi-superconduction the foremost of which is commercial and residential electrical transmission.

Abstract

A heretofore unexplored application for 2D materials is the exploitation of the innate simplification of the Hall Effect by 2D materials. When electricity passes through a conductive 2D material such as graphene or hexa-boron nitride (hBn,) Hall Effect-associated loss of current is necessarily two-dimensional i.e. the energy "leaks" in a planar fashion rather than in all directions.

A series of hBn sheets, each of which are square and sub-micron in length could be linked together at the corners like a daisy chain. Electricity may be passed from a cathode situated at the corner at one end of this chain so that the angular momentum of electrons moves diagonally i.e. from corner to corner, having to pass through the overlapping corners to hop from one connected sheet to the next. Some electrons would naturally spread out over the full area of the sheets and run along the edges of the sheet prior to being funneled toward the connecting corner.

At these bottlenecks, a dynamical relationship between electrons with different characteristics of angular momentum and discrete magnetic output directionality would result in a "reset" at these bottlenecks in terms of Hall Effect-associated angular momentum deviation that results in electrons that had been "peeling out" to invert and begin to "peel inward" after passing through the bottleneck. Electrons with a true heading would continue on that heading and the electrons that took a more circuitous course would, despite flowing near the edges where leaking may occur, would be bestowed by their interaction with other electrons in the bottleneck with inverse spin characteristics that prevent their leakage.

These daisy chains of sheets may be stacked atop and to the side of one another to form conductive pathways consisting of a great many ultra-thin wires

composed of connected 2D sheets in order to facilitate the transmission substantial current.

Importantly, the oscillatory frequency of the energy transmitted would need to be matched with the dimensions of the sheets, which would transmute that frequency as current passes through thousands of these links. The frequency of the delivered energy would be dictated by the dimensions of the sheets used.

Conclusion

Extreme precision would be required in both ensuring uniformity of the dimensions of the sheets as well as their relative area of overlap in order for Hall Effect mitigation to be ensured. This method should be more efficient than the nano-dynamo magnetic back-conversion method as it preserves electrons as charge carriers without the need for conversion of magnetism back into electrical current, which introduces inefficiency.